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**BSc Architecture and Spatial Planning**

 **Syllabus**

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| **Subject** | **ENERGY EFFICIENCY**  |
| Status | Semester |  | ECTS |  | Code |
| Obligatory (O) | 4 |  | 2 |  | 30-EFE-270 |
| **Teacher of the subject:** | Prof. Ass. Kreshnik Muhaxheri |
| **Asistant of the subject**  |  |
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| **Aims and Objectives** | This course will explore the fundamental concepts to understand and realize energy efficiency in buildings as part of the profile education of Architecture and Spatial Planning, including the role of the architect in planning and implementing EE measures in buildings to ensure a comfortable and healthy environment for users with low operating costs.During these lectures, students will get to know and acquire the basic notions of EE and the efficient use of energy in buildings. Through the recognition of the function and quality of the building, they will become familiar with the use of energy saving resources and the basic characteristics of the building with high energy efficiency. The aspect of the historical evolution of the techniques and concepts of energy efficient buildings are addressed in a special way with design and construction recommendations.Subsequently, students will be introduced to the architectural approach to the sustainable buildings design with the connotation of the interconnection of energy, climate and architecture topics.Specifically, the energy performance of the building will be determined through the definition of energy efficiency requirements for buildings both in technical and legal aspects and in the context of the developments of the EU countries.Thermal comfort and indoor climate in buildings are a special subjects that aims to give students an overview of how people perceive indoor climate, the nature of the most important factors of thermal comfort, how to define them and the used terminology.Through information on designing of the energy-efficient buildings, construction technologies will be presented and the building envelope will be defined as a specific topic. As a continuation of this, the designing principles of external walls, thermal insulation of external walls, basic information and the selection of fenestration as well as thermal bridges in buildings, will be presented.The building thermal performance will be analyzed through simple methods for modeling the energy transmission between the building and the surrounding environment and determining the performance with relevant examples.To carry out these analyses, the notion of U values ​​of each building envelope element will be defined through the knowledge of the thermal properties of materials and products, and the method of calculation and use will be taught.Since there are many barriers that prevent the implementation of energy efficiency measures in new buildings, there is a permanent requirement to know the current legislation dealing with energy efficiency in new buildings. Based on these knowledge and requirements, students will learn and perform a simple audit of the building and the proposal of measures to raise the energy performance of existing buildings by implementing EE measures. |
| **Anticipated results** | The main aim of the course is to acquaint students with the basics of energy efficiency in buildings. This is achieved by applying theory to practice, based on current world literature and experience to prepare students to apply what they have learned.Specific objectives:* This course covers the technical, legal and practical aspects of energy efficiency in buildings in order to:
* Providing students with a broad vision of the application of the EE concept in buildings from spatial planning to individual projects
* Providing sufficient detail to engage productively in any of the topics, and providing resources for information and collaboration.
* With this course, students are expected to be educated and motivated as dedicated professionals to design the new environment and improve the built environment.
* After completing the course, students will be able to answer the following questions:
* What technologies and design options can advance energy efficiency in buildings?
* What is the role of codes and standards and how can they be structured to promote energy efficiency in buildings?
* How can energy efficiency be measured, evaluated and verified?
* What are some additional resources to retrofit a building with high energy consumption into an energy efficient building with thermal comfort?
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